Rotary Dryer Drive Power

Shaft power to turn a flighted rotary dryer from its speed, diameter, material load and total rotating load, by the Raymond (Combustion Engineering) formula.

Method: Rotary dryer drive power formula (Raymond Division, Combustion Engineering)

Input parameters

Unit system: SI

Parameter	Value	Unit
Rotational speed	4.0000	rpm
Shell diameter	1.8000	m
Material load in the dryer	3,000.0	kg
Total rotating load (shell, flights, tyres and material)	30,000	kg
Drive efficiency	85.000	%

Calculated results

Parameter	Value	Unit
Shaft power	9.1871	kW
Brake horsepower	12.320	
Motor power	10.808	kW

Notes for this case

• The empirical formula bhp = N(4.75 D w + 0.1925 D′ W + 0.33 W)/100 000, with N in rpm, D in ft, w and W in lb and the riding-ring diameter D′ taken as D + 2 ft, covers lifting the material by the flights, rolling friction on the tyres and trunnion friction. Inputs are SI and converted. Add the fan power separately, and size the motor for starting a fully loaded dryer.

Formula and method

$$bhp = \frac{N(4.75Dw + 0.1925D'W + 0.33W)}{100\,000}, \quad D' = D + 2\ \text{ft}$$

Variables

N	Rotational speed	rad/s
D	Shell diameter	m
w	Material load in the dryer	kg
W	Total rotating load (shell, flights, tyres and material)	kg
η	Drive efficiency	-
P	Shaft power	W
bhp	Brake horsepower	-
P_m	Motor power	W

Method and standards

Drive power.

Assumptions and limits

- Empirical; US units converted from SI.

References

Rotary dryer drive power formula (Raymond Division, Combustion Engineering)

Report details

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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/chemical/drying/rotary-dryer-drive-power

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.